

And I regret that a writer ordinarily so clear-sighted and judicious has been misled by one whose services to the study of Hindu religion and literature can hardly be overrated, and whose contributions to philology and, indeed, the science of religion it would be the veriest ingratitude not to recognise. The rest of my task is more pleasant. To discuss a subject so vast as religion in a little volume of some four hundred pages is no mean undertaking. It cannot be expected that the writer will satisfy his critics on all points. No fulness of treatment would probably enable him to do this, and where so much has to be compressed or entirely passed over it is hopeless to think of it. Besides, the questions dealt with are such that at every point he encounters prejudice and runs the risk of wounding the innermost and most sacred feelings. Among these difficulties Prof. Jastrow has tried to find his way. Owing to his charity and sympathy with the most diverse manifestations of the religious spirit, to his circumspection, to his large views of history and to his dispassionate judgment, he has, on the whole, succeeded admirably. His opening chapter on the history of the study, and those on religion and history and religion and culture, display in full measure all the qualities referred to. The practical suggestions contained in the final section deserve careful consideration. In the chapter on the study of the sources the standard is fixed very high. It is well that it should be so. But it is to be observed that the exhaustive study demanded for the religion to which the student proposes to dedicate himself will, in the case of most students, leave but little time for that acquaintance which the writer demands, and rightly demands, with other religions.

"In order to understand one religion," he says, "we must be acquainted with more than one. Religions with literatures differ far more from one another than those which possess none. Hence it is not sufficient to study merely one religion direct from the sources."

By this expression the author means the study of the religious literature in the original tongue. He does not mention, though his illustration of the Hebrew word *goel* evidently implies, a study of the history and culture of the people concerned outside their religion. To continue the quotation:—

"Studying two in this way may be set down as a minimum for acquiring that firmness of method and keenness of judgment needed for the chief problem of religious research—the interpretation of facts. This does not imply that the two are to be cultivated with equal intensity, or that the entire field of both must be covered, but only that in addition to the one religion which forms one's special object of research, one should be able to acquire a sufficient knowledge of a second religion, direct from its sources, as to be able to penetrate into the spirit of that religion."

The ideal is excellent. And yet I am not sure that a more important service may not sometimes be rendered to the study of a religion by one who is ignorant even of the original language, if he be able to bring to bear upon a study of first-rate translations a wide ethnographical knowledge, and therefore to compare the practices of totally different races and cultures. How, for example, would a study of the sources of Hebrew and Egyptian religions, or Hebrew and Hindu religions, even

if we add Mohammedanism and Zoroastrianism, enable us to solve the origin and meaning of the rite of circumcision? Robertson Smith could never have written his "Religion of the Semites" if he had been *simply* a student, from the sources, of the Hebrew and Arab religions. A general acquaintance with the results of anthropological study of savage peoples was of more value to him than the study of the literatures of half-a-dozen civilised religions would have been.

I have no space to do more than refer to the cogent arguments with which the author enforces the need for the scientific study of religion in higher education generally, and especially in mission-colleges, or to his exposition of the utility of museums in the study. These chapters, not less than the earlier parts of the book, deserve to be carefully read. The appendices illustrate them by showing actual courses of lectures delivered at the École des Hautes Études at Paris, and the arrangement of the Musée Guimet, which was specially formed to aid the study of religion. To guide the student, a bibliography is added of a remarkably catholic character.

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CHEMISTRY FOR COLLEGES.

A College Text-Book of Chemistry. By Ira Remsen. Pp. xx+689. (London: Macmillan and Co., Ltd., 1901.) Price 8s. 6d. net.

THIS book is intended to fill a place between the "Introduction to the Study of Chemistry" and the "Inorganic Chemistry" by the same author. The style and plan of the book may be estimated from the author's remark in the preface, where he expresses the opinion that "The time has not yet come for the abandonment of the study of elements and their compounds in what some are pleased to call the old-fashioned way." Intended, as its name implies, for the use of colleges, the book differs in no essential particulars from other text-books of the same scope. The arrangement adopted for the treatment of the subject is one that has in more recent years repeatedly appeared, a few typical elements and their compounds being studied in some detail in the earlier chapters, and the main bulk of the subject subsequently dealt with from the standpoint of the periodic law. Each descriptive chapter is followed by a number of experiments to be carried out by the student, whose power of observation is aided and developed by the manner in which many suggestive questions are asked concerning each experiment. A number of chapters throughout the book are devoted to a discussion of the principles of theoretical chemistry, and it is in reading these that we are more particularly struck with the loose and inaccurate expressions that are more or less characteristic of the book. Thus it is not the best definition of energy to say that it is "that which causes change in matter." Again, in discussing chemical changes, the student is told to "consider the changes included under the head of fire." Is not fire rather a phenomenon accompanying these changes? In discussing the law of conservation of energy the incomplete statement is made that "from a certain amount of heat we can get a certain amount of motion, and that for a

certain amount of motion we can get a certain amount of heat." In the first place this form of statement is likely to give the impression that heat is something entirely different from motion, and in the second place it implies that heat and motion are quantitatively convertible, which is not strictly true. Further on the statement is made that in order to bring about chemical change "high heat must be used to aid the reaction."

A great number of similar expressions are to be found scattered throughout the book, and it seems a very short-sighted policy to sacrifice accuracy and the use of scientific modes of expression, even in attempting to make matters more intelligible to beginners, as it is far more difficult to get rid of early false impressions than to acquire correct ones in the first place. This sort of treatment is especially to be noticed in the author's account of the ionic theory. On p. 90, ions are first introduced very briefly to the notice of the student, and throughout the succeeding pages many reactions are represented as due to action between the ions; and equations are printed in which the ions are represented as atoms. This must be exceedingly confusing to the student who has been told in another place that atoms, generally speaking, cannot exist in the free state; and it is not until p. 417 that this difficulty is overcome for the student by the true explanation of the nature of an ion. Another serious misstatement occurs in the account of the phenomena of osmotic pressure, where, after quoting the extension of Avogadro's law to solutions, the following passage appears: "Notwithstanding the simplicity of this law, no practical method for determining molecular weight based upon it has yet been devised."

The more descriptive part of the book is also not free from inaccuracies. For example, in one portion of the table on p. 15 the atomic weights are referred to $H=1$, in another part of the same table to $O=16$. The term combining weight is itself used in two different senses in different parts of the book; in the earlier portion it is used as synonymous with atomic weight, and in the later portion as a simple submultiple of the latter. Another discrepancy is that which ascribes to krypton on p. 19 the atomic weight 81.8 and on p. 262 58.67. It is disappointing to find the author of so excellent a work as the admirable little book on organic chemistry failing to come up to the standard of accuracy which is now demanded of teachers.

HYDRAULICS.

A Treatise on Hydraulics. By Henry T. Bovey, M. Inst. C. E. Second edition, rewritten. Pp. xviii + 583. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1901.)

THE author of this treatise, in his position of professor of civil engineering and applied mechanics at McGill University, Montreal, has exceptional opportunities for conducting experimental investigations on the flow of water, owing to the remarkably complete equipment of the hydraulic laboratory under his charge, which the University owes, in addition to many other endowments, to the munificent liberality of Sir William C. McDonald, a well-known merchant residing in Montreal.

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It is very satisfactory to note that Prof. Bovey has made full use of his opportunities in advancing the study of hydraulics, as indicated, in the first instance, by the publication of the first edition of this book in 1895; whilst this second edition, with its rearrangement, its large quantity of new matter, and its additional tables of experimental results, marks the progress which has been made in the interval towards raising the subject of hydraulics, so long based on empirical formulæ, into the position of an exact science.

The subject is divided into eight chapters, to each of which, in addition to examples worked out in the text, is appended a number of problems for the student, relating to the questions dealt with in the chapter, together with their answers. The book begins with a chapter on general principles and the flow through orifices and over weirs, followed by one on fluid-friction and pipe-flow, and another on the flow of water in open channels; and these three chapters, each extending over more than a hundred pages, complete the portion relating to the flow of water, and occupy more than half the book. They furnish a fairly exhaustive treatment of the subject; but though, owing to the large print, the widely-spaced formulæ, the numerous diagrams, and the tables, the actual contents of these chapters are not so great as might be inferred from the number of pages they occupy, the chapters are inconveniently long, and might with advantage have been subdivided. This is undoubtedly the portion of the book to which civil engineers engaged in water-works, irrigation, and river improvement will mainly refer for an elucidation of the difficulties involved in the correct determination of the flow of water through orifices, over weirs, along pipes, and in open channels. A chapter is devoted to the important subject of hydraulic machinery, including rams, presses, accumulators, and water-pressure engines. Three chapters relate to water-motors, dealing successively with impact, reaction, and the principles of impact and tangential turbines, vertical water-wheels, and turbines; and the final chapter deals with centrifugal pumps. The book is illustrated by three hundred and thirty figures in the text, mainly diagrams for elucidating the various theories and principles dealt with, together with a few drawings of machines referred to; whilst a very convenient paged list of the various headings of subjects throughout the book is given in the table of contents at the commencement, and a concise but useful index concludes the volume.

The mathematical treatment adopted right through, with the four hundred and forty-six examples given for working out, render the book more especially suitable for students in hydraulics who have had a previous mathematical training, the book having, indeed, been originally the outcome of a series of lectures to such students; and it will be doubtless of interest to hydraulicians, particularly in view of the advance it manifests in hydraulic science. A less elaborate and less educational method would probably have more favourably commended the book to the notice of practical engineers interested in hydraulic problems; and, in its present shape, the book seems likely, irrespective of its value to hydraulic students, to be mainly advantageous to those engineers